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STRATEGIC STUDIES INSTITUTE
US ARMY WAR COLLEGE
Carlisle Barracks, Pennsylvania

6 FUTURES GROUP PERIODIC REPORT--4

by

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11/ 1 Dec 1980

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FOREWORD

This Periodic Report of the Futures Group of the Strategic Studies Institute presents a review of work completed and in progress, as well as summaries of selected forecasts. The Report of the President, "Global 2000," is reviewed. In addition, nuclear proliferation, the issues of the role of women in the service, continued detente, Third World participation in science and technology, and advances in medicine are considered.

This report was prepared as a contribution to the field of national security research and study. As such, it does not reflect the official view of the US Army War College, the Department of the Army, or the Department of Defense.

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INTRODUCTION

The Futures Group has continued its efforts to identify sources of conflict, and has begun its examination of means to deal with predicted conflict. The work accomplished to date and underway is intended to provide the framework for a long-range strategy for the Army. Two analysts have just been assigned to the development of a concept paper which will attempt to identify questions which need to be resolved in order to produce a long-range strategy.

It is anticipated that much of the work already accomplished by the Futures Group will provide a basis for the development of the overall Army strategic environment at the beginning of the 21st century. As work progresses on the strategy concept, the Futures Group will become aware of areas requiring additional research and analysis.

Two members of the Futures Group attended the First Global Conference on the Future in Toronto, Canada, in July. The opportunity to hear the many ideas presented, to participate in discussions, and develop contacts has proved very beneficial.

The Futures Group has continued to solicit ideas and comments on its work and welcomes proposals from readers of this report.

REVIEW OF WORK

In response to a DA staff requirement, the Futures Group, on very short notice, prepared a paper to identify those conditions existing in the year 2000 which will have the greatest impact on the US Army. This paper, "The Year 2000 and the US Army," will be distributed to a number of the Group's contacts for their review and comments. It is anticipated that the Group will continue to refine and update this paper.

One of the goals of the Futures Group has been to analyze statements on the changes in national policy for long range military implications. Mr. John Scott's paper, "The New US Nuclear Strategy," was the Group's first effort in policy analysis. The paper, published in September, concluded that the critical point for long-term implications will be a decision about whether arms control or arms competition will shape the strategic balance of the 1990's. Mr. Scott is now preparing an analysis of NATO's December 1979 Long Range Theater Nuclear Force decision. Appendix A provides a synopsis of the problem.

Dr. Robert Darius has written a paper, "The Soviet Union, Iran and Pakistan in the 1990's: Security Implications for the United States." He concludes that the US strategic interests in Pakistan and Iran will continue to be in conflict with those of the Soviet Union and that the Army needs to expand its role in Foreign Military Sales and International Education and Training as well as increase its readiness to be employed in this region.

Mr. William Kennedy has prepared a paper, "The Future of US-Japan Military Relations 1990-2000." The author concludes that there is a requirement for a thorough examination of the complexities of the US-Japan political-economic-security relationship. The author believes that these complexities are little understood in the US Government.

REVIEW OF LITERATURE

The material in this section reports some of the concerns reflected in current futurist literature which have significant implications for the Army. In most cases, the separate topics present information contained in a number of sources.

"Global 2000." The Carter Administration officials have described the report, "Global 2000," as the most exhaustive and well documented study ever produced on long-term changes in the world's population, environment, natural resources, and the implications of those changes.¹ "Global 2000" depicts conditions which are likely to exist in the year 2000. The study is based on a surprise-free projection of current trends; therefore, it does not consider possible changes in public policy and actions (which it strongly recommends), breakthroughs in technology, or war.

The projection is that the world in 2000 will be different from the world today in the following important ways.

There will be more people. For every two persons on the earth in 1975 there will be three in 2000. The number of poor will have increased. Four-fifths of the world's population will live in less developed countries. Furthermore, in terms of persons per year added to the world, population growth will be 40 percent higher in 2000 than in 1975.

The gap between the richest and the poorest will have increased. By every measure of material welfare the study provides--per capita GNP and consumption of food, energy, and minerals--the gap will widen. For example, the gap between the GNP per capita in the LDCs and the industrialized countries is projected to grow from about \$4,000 in 1975 to about \$7,900 in 2000. Great disparities within countries are also expected to continue.

There will be fewer resources to go around. While on a worldwide average there was about four-tenths of a hectare of arable land per person in 1975, there will be only about one-quarter hectare per person in 2000. By 2000 nearly 1,000 billion barrels of the world's total original petroleum resource of approximately 2,000 billion barrels will

1. The study was ordered by the President in 1977, released 24 Jul 80.

have been consumed. Over just the 1975-2000 period, the world's remaining petroleum resources per capita can be expected to decline by at least 50 percent. Over the same period world per capita water supplies will decline by 35 percent because of greater population alone; increasing competing demands will be further pressure on available water supplies. The world's per capita growing stock of wood is projected to be 47 percent lower in 2000 than in 1978.

The environment will have lost important life-supporting capabilities. By 2000, 40 percent of the forests still remaining in the LDCs in 1978 will have been razed. The atmospheric concentration of carbon dioxide will be nearly one-third higher than preindustrial levels. Soil erosion will have removed, on the average, several inches of soil from croplands all over the world. Desertification (including salinization) may have claimed a significant fraction of the world's rangeland and cropland. Over little more than two decades, 15-20 percent of the earth's total species of plants and animals will have become extinct--a loss of at least 500,000 species.

Prices will be higher. The price of many of the most vital resources is projected to raise in real terms--that is, over and above inflation. In order to meet projected demand, a 100 percent increase in the real price of food will be required. To keep energy demand in line with anticipated supplies, the real price of energy is assumed to rise more than 150 percent over the 1975-2000 period. Supplies of water, agricultural land, forest products, and many traditional marine fish species are projected to decline relative to growing demand at current prices, which suggests that real price rises will occur in these sectors too. Collectively, the projections suggest that resource-based inflationary pressures will continue and intensify, especially in nations that are poor in resources or are rapidly depleting their resources.

The world will be more vulnerable both to natural disaster and to disruptions from human causes. Most nations are likely to be still more dependent on foreign sources of energy in 2000 than they are today. Food production will be more vulnerable to disruptions of fossil fuel energy supplies and to weather fluctuations as cultivation expands to more marginal areas. The loss of diverse germ plasm in local strains and wild progenitors of food crops, together with the increase of monoculture, could lead to greater risks of massive crop failures. Large numbers of people will be vulnerable to higher food prices or even famine when adverse weather occurs. The world will be more vulnerable to the disruptive effects of war. The tensions that could lead to war will have multiplied. The potential for conflict over fresh water alone is understood by the fact that out of 200 of the world's major river basins, 148 are shared by two countries and 52 are shared by three to ten countries. Long standing conflicts over shared rivers such as the Plata (Brazil, Argentina), Euphrates (Syria, Iraq), or Ganges (Bangladesh, India) could easily intensify.²

2. "Report Wages Global Actions on Resources, The New York Times, July 24, 1980, From the "Global 2000" report to the President, Volume 1, pages 39-40.

The report concludes that:

The time for action to prevent this outcome is running out. Unless nations collectively and individually take bold and imaginative steps toward improved social and economic conditions, reduced fertility, better management of resources, and protection of the environment, the world must expect a troubled entry into the twenty-first century.³

As a result of this report, President Carter has established an inter-agency task force

to give high priority attention to the global resource, population and environmental problems and seek ways to improve the government's capability for analyzing global trends. The task force will in effect develop policy recommendations to give the report ['Global 2000'] which, as it stands, contains none.⁴

As officially established, Department of Defense input to this task force is limited to a liaison function.

The most obvious "Global 2000" implications for the military are contained in the statements that "the world will be more vulnerable to the disruptive effects of war," and "the tensions that lead to war will have multiplied."⁵ We should design our actions to attack the vulnerabilities of our enemies but at the same time must take care to avoid a creation of conditions which would adversely impact on our own position. We should also study our own vulnerabilities to avoid presenting an easy target to our enemies. The statement that the tensions that could lead to war will have multiplied implies a more likely occurrence of war. If the United States develops a policy designed to lessen these tensions, the military could play a peaceful and significant role in carrying out that policy. In the event that war does take place, there could be a significant role for the military whether or not the United States is a combatant power.

3. Ibid, p. 42.

4. Luther J. Carter, "Global 2000 Report: Vision of a Gloomy World," Science, Vol. 209, August 1, 1980, p. 575.

5. The vulnerability implications mean that in future wars we must carefully study the impact of our actions.

Considering that the greatest sources of poverty are in the Third World countries and given that it is the frustration borne of that poverty which will increase the changes, it follows that the most likely location of war will be in the Third World countries. This means that if the United States is to exercise military influence in those conflicts our forces must be prepared to participate in conflicts in areas in addition to Korea and Germany.

Finally, the recommendation that the United States involve itself in improving the economic conditions of the world suggests the expenditure of large sums of the Federal budget. Unless an extraordinary change of national will takes place, any significant expenditure such as that will be made only at the expense of other activities. Particularly in this budgetary area, the Department of Defense must ensure that it maintains its proper position.

Nuclear Power or Nuclear Club? At the end of 1975 there were 168 nuclear power plants in operation throughout the world.⁶ By the beginning of 1979 there were 224 plants;⁷ an increase of 25 percent in a 3-year period. If that rate continues, there could be as many as 448 in 1991 and as many as 616 nuclear power plants in the year 2000 scattered world-wide to provide for the world's increasing energy demands. The number of countries acquiring nuclear power plants is also increasing; from 19 to 22 as depicted in Table 1. The precise number of nations or power plants is not as important as how many nations will use their nuclear power for peaceful purposes or use it to develop nuclear weapons.

The world's energy demands can be expected to increase steadily (approximately doubling) toward the year 2000 for four general reasons:⁸ the absolute

6. Frank C. Barnaby, "How States Can 'Go Nuclear'," The Annals of the American Academy of Political and Social Science, Vol. 430, March 1977, p. 34.

7. R. Krymm and J. P. Charpentier, "Nuclear Power Development: Present Role and Medium Term Prospects," International Atomic Energy Agency Bulletin, Vol. 22, No. 2, April 1980, p. 11.

8. Ibid., pp. 12-13.

Country	Number of Reactors		Estimated Share of Total Electricity Mid-1977 to Mid-1978 (%) ^c
	31 Dec 1975 ^a	1 Jan 1979 ^b	
Argentina	1	1	0.5
Belgium	3	4	22
Bulgaria	2	2	-
Canada	7	10	10
Czechoslovakia	1	1	-
Finland	-	2	9
France	10	14	10
Germany, DR	3	4	-
Germany, FR	8	13	8
India	3	3	2
Italy	3	4	2
Japan	12	19	6
Korea, South	-	1	-
Netherlands	2	2	6
Pakistan	1	1	1
Spain	3	3	6
Sweden	5	6	22
Switzerland	3	3	17
Taiwan	-	2	-
UK	29	33	10
USA	54	68	11
USSR	18	28	3.5
TOTALS	168	224	

a. Barnaby, p. 34.

b. Krymm and Charpentier, p. 12

c. Ibid., p. 13.

Table 1. Nuclear Power Reactors in Operation and Estimated Share of Total Electricity Provided by Nuclear Reactors.

increase in the world's population, especially in the developing countries; the expanding economic development throughout the world; the same lags inherent in the implementation of energy conservation in the industrial countries; and the increasing recourse to poorer mineral ores and to waste recycling. The increase in energy demand will occur despite the efforts of the industrial nations to conserve energy and even if more efficient methods of production and utilization are developed. As world population increases so will energy demand. Conservative assumptions by the United Nations Statistical Office indicate a world population increase of more than 50 percent over the next 20 years, from its current level of 4.2 billion to about 6.4 billion by the turn of the century. The present distribution and expected trends in the world's population are summarized in Table 2.

A disparity in the average per capita consumption of energy (more than 8 times) now exists between the industrialized and developing countries. The disparity, which corresponds to the gap in the standing of living, will be reduced through economic and industrial development (the transfer of technology) over the next two decades. The process of development will necessarily involve rapid growth of commercial energy demand since the initial stages of industrialization are particularly energy intensive.⁹ This will bring about a substantial increase in the world's energy needs over the next two decades. Such needs can be best met by nuclear power diffusion throughout the world. It is, possible, however, that some of the developing nations listed in Table 1, as well as others not listed but who will acquire reactors over the next decade, might decide to divert nuclear fuel from peaceful use into the development of nuclear weapons. It should be borne in mind that the transition from the use of nuclear fuel for energy purposes to the production of a nuclear weapon is complicated.

9. Ibid., p. 18.

Region	Year 1978	Year 1985	Avg. annual growth rate 1978-1985 (%)	Year 2000	Avg. annual growth rate 1985-2000 (%)
(1) OECD North America	243.5	262	1.05	296	0.8
(2) OECD Europe	390.3	412	0.78	460	0.7
(3) OECD Pacific	132.3	142	1.02	157	0.7
(4) Centrally planned economies (Europe) ^a	395.5	421	0.90	466	0.7
(5) Asia ^b	2,194.0	2,575	2.31	3,361	1.8
(6) Latin America	346	424	2.95	618	2.5
(7) Africa & Middle East	489.9	649	4.10	995	2.9
World total:	4,191.5	4,885	2.21	6,353	1.8
Industrial countries ^c	1,191.9	1,268	0.89	1,420	0.8
Developing countries ^d	2,999.6	3,617	2.71	4,933	2.1

^aInlcudes Yugoslavia

^bIncludes China and Taiwan

^cComposed of (1), (2), (3), (4) plus South Africa

^dComposed of (5), (6), (7) minus South Africa

Table 2. Estimate of World Population (millions).¹⁰

¹⁰. Krymm and Charpentier, p. 17.

Technological expertise, time, money, special facilities, and weapon-grade plutonium are essential for the construction of a nuclear weapon. "Irrespective of its peaceful nuclear program, a country may decide to acquire and operate clandestinely a reactor specifically for military purposes."¹¹ If a small reactor and reprocessing unit were obtained secretly (the construction plans and the materials to build them are available in the open literature), a modest number of weapons could be developed with a low risk of detection.

Such diversions are possible hazards during peacetime regardless of the safety and nonproliferation requirements of the International Atomic Energy Agency and inspection controls set by responsible nuclear fuel supplier nations. Far greater and special hazards involving nuclear plants and control of nuclear fuels exist during times of war.¹² First, the ever present possibility of radioactive environmental pollution caused by the military destruction of reactors--a possibility which, however, is minimized by the special concrete containment constructions housing nuclear reactors. And second, by the diversion, perhaps as an act of desperation, of nuclear fuel by a nation to build a nuclear weapon for use or threatened use against the opposing nonnuclear nation with which it is at war.

Some general reasons for diversion toward the development of nuclear weapons¹³ or their acquisition by other means are:

- a. To achieve a military superiority over an enemy or political enemy;

11. Barnaby, pp. 35-39.

12. Eliot Marshall, "Iraqi Nuclear Program Halted by Bombing," Science, Vol. 210, No. 4469, 31 October 1980, pp. 507-508.

13. William Epstein, "Why States Go--and Don't Go--Nuclear," The Annals of the American Academy of Political and Social Science, Vol. 430, March 1977, p. 18.

b. To achieve an effective deterrent against a hostile nuclear or conventional power;

c. To assure a nuclear weapon capability or at least a nuclear option before an adversary does; and

d. To achieve a greater degree of military independence from one or more nuclear powers.

Regardless of their status as a nonsignatory or signatory (which can withdraw on three months' notice) to the Non-Proliferation Treaty, the following nations by the end of the century will have energy demands requiring nuclear reactors or an increased number of reactors and, according to Epstein¹⁴ are the most likely candidates to develop nuclear weapons: Argentina, Brazil, Chile, Cuba, Egypt, Indonesia, Iran, Israel, Libya, Pakistan, Turkey, South Africa, South Korea, Spain, Switzerland, Taiwan, Yugoslavia, and possibly some of the small Warsaw Pact powers in Eastern Europe. This list might very well include Australia, Canada, West Germany, Italy, Japan, the Netherlands, and Sweden whose advanced nuclear technologies and capabilities could allow them to go nuclear easily and quickly.¹⁵ It is becoming increasingly apparent that the reasons for nations to choose a nuclear weapons option outweigh opposing reasons. Increasing economic and political requirements for the transfer of nuclear technology and the development of national nuclear power programs throughout the nations of the world increase the potential capabilities for these nations to produce nuclear

14. Ibid., p. 20.

15. Ibid., p. 25.

weapons. Whether a country decides to produce weapons or not depends on its perception of threats to its survival and security, its economic and technological constraints, and the effectiveness of international legal controls.

As for the world's energy needs, they will continue to expand. By the end of the century, nuclear power is expected to account for 26-35 percent of total electricity production. The progressive introduction of more advanced nuclear power systems, producing low or no weapons-grade material, under strict international safeguards, are needed to discourage, if not prevent, continued nuclear weapons proliferation. The implication for the Army, which is stated only for emphasis, is that the extended use of nuclear energy will increase the likelihood of nuclear war and that the Army will have to be prepared for possible involvement in such conflict outside NATO.

Detente to 2000? A recent article in The Economist¹⁶ points out that West Germany's Chancellor Helmut Schmidt believes that because of detente both West and East Germany are more secure today than ever before. This belief of Chancellor Schmidt and the Social Democrats (the party presently in power) probably will be perpetuated by Schmidt's reelection and far beyond the 1980 election. Preserving detente will become increasingly significant toward the support of peace and economic stability in Europe, at least over the next two decades. Some other reasoning behind this belief involves demographic trends throughout Europe and the ability of individual nations to raise and maintain an army.

Consider the following demographic projections: The West German population will decline by 3,000,000 (5 percent) by 1995 at its present growth rate. However, as zero population growth is achieved, changes in the distribution of age structure will be increasingly evident. By 1994, West Germany's armed forces qualified youth recruiting pool of 18 year olds will shrink from 310,000

16. "The Old Firm," The Economist, Vol. 276, No. 7150, September 13, 1980, pp. 14-15.

this year to 177,000. West Germany currently inducts about 200,000 per year to maintain its military structure. Most other NATO member countries are faced with a similar shrinking of their populations and the accompanying redistribution of the age structure. The same is projected for East Germany. In other Warsaw Pact member countries, the shrinking is less evident but, nonetheless, occurring.

The pattern is much the same in the Soviet population, especially in the European area, where the annual average rate of population growth is expected to drop to about 0.6 percent in 1990-2000. However, in the Soviet Asian regions, where some of the highest birthrates in the world exist, the population will continue to expand. For the Soviet Union, this has resulted in several problems of regional labor surpluses, ethnic and skilled worker emigration, and problems of meeting the demands for civilian and military manpower.¹⁷ As some Western analysts already have noted, these regional disparities in current and future manpower increments foreshadow changes in the structure of the Soviet military and nonmilitary institutions, regardless of what measures Soviet leaders take to reverse these trends. Their ability to make large-scale and rapid changes to existing fertility rates in either the European or Asian regions is problematical.

For all of Europe and the Soviet Union European region the decline in population and the shifts in the distribution of age structure will continue through 1995 with signs of recovery occurring around the year 2000.

Considering these demographic projections, it would appear that maintaining an atmosphere of detente over the next two decades would benefit other NATO member countries as well as West Germany and the Warsaw Pact member nations. One of the major difficulties for the Army in a continuation of detente results from the apparent national dichotomy of reducing the military threat and maintaining an adequate force.

17. RAND Corporation, Alternatives for Mobilizing Soviet Central Asian Labor: Outmigration and Regional Development, by S. Enders Wimbush and Dmitry Ponomareff, R-2476-AF, Santa Monica: November 1979.

Women in Combat. Increasing the number of women in the Army, from a traditional point of view, runs contrary to a centuries old and inbred male attitude of chivalry as well as into the suitability of women in active combat roles. So long as combat is defined empirically (as perceived in terms of World War II, the Korean War, or the war in Vietnam), the gallant American male is unlikely to approve, let alone assign, women in combat roles. The fraternal, chauvinistic, sanguinary nature of the soldier in the foxhole of past conflicts suggests (from a male point of view) a lesser, more feminine role for women who would be so courageous and patriotic to wear the Army green. But this is defining war as men have known it. What about combat twenty years from today? In all likelihood, the nature of combat will change. There could well be a reduction in incidence of face to face combat. It could become more impersonal and many combatants may be button pushers who will only see the enemy as symbols on a map or computer display. Since combat will probably be defined differently in twenty years, will attitudes toward women in combat also change?

In a recent article,¹⁸ Robert Claiborne points out the obvious male/female unique characteristics inherent in most animal species: males are more combative and competitive than females; males have evolutionary traits of providing for and of protecting females; males engage in more strenuous physical activities than females, and males consistently learn male roles, and females, female ones. The difference is both physical and psychological: "Most men," writes Claiborne, "apparently have a certain built-in bias that women lack toward learning some kinds of aggressive activities. . . . Most women have a certain bias toward a relatively quiet and pacific life that most males lack." He goes on to write

18. Robert Claiborne, "His Brain and Hers," Science Digest, Special edition, September/October 1980, pp. 14-15. See also, Warren Boroson, "Which Sex Differences Will Endure?" NEXT, Preview Issue, 1979, pp. 36-43.

that "the whole notion of inherent psychological [and physical] differences between the sexes is repugnant to some women to whom 'different' implies inferior." The difference, of course, is obvious but it is not inferior. As time proceeds toward the turn of the century, social and technological changes will become increasingly important factors relative to, and more clearly defining, the role of women in the Army.

Within current social changes, there has been a continuing increase in the number of women choosing not to bear children and many are declining a domestic role and even marriage. With the steadily increasing number of women entering into the work force, there is an increasing likelihood of women selecting a military career, provided they perceive a meaningful and "equal" role. The variety of life-styles available to both men and women is also steadily increasing. Many definitions of today will have to change and new norms will have to be accepted. The male/female characteristics Claiborne describes probably will change only slightly, if at all, by the turn of the century. What males and females learn (and accept) as their individual roles will change most; many will likely overlap. As the military become more technologically oriented and as new perceptions of combat develop, male attitudes toward women in combat will undoubtedly change also.

The technological innovations related to military operations that will come into being over the next twenty years will likely require new perceptions of combat roles, many of which might even be more suitable for women than men. The area of technological aspects of future combat operations is where women might possibly be trained today for their future combat roles. Merely by broadening today's definition of combat to include its probable future context, women could find a meaningful and "equal" role while, over time, combat as known today would be phased out as a primary training effort.

Third World Science and Technology. Toward the year 2000, Third World nations will have an increasing need for national science and technology programs. Such programs must begin today to promote the development of human resources, scientifically and socially. The need will continue to grow and will vary according to each developing nation's perceived requirements for modernization of the industrial and agricultural sectors of its economy. The long-term interest of the United States during this Third World development is maintaining good foreign relations and encouraging mutual national security. The basic problem facing the Third World nations is how to finance their science and technology programs.

In 1979, "Americans spent more on potted plants and flowers (over \$5 billion) than they did on aid to the third world (\$4.6 billion)."¹⁹ Congress and the American people have not been in a generous mood. The bulk of US aid given has been concentrated in the hands of a few favored countries to promote economic and political stability in regions the United States regards as vital to its interests. Such bilateral aid falls into three categories: development assistance, economic support funds, and food shipments. A fourth category, not included in the figures above, includes military assistance. None of these categories, however, contributes toward Third World scientific and technological programs. US foreign aid appropriations bills are subject to the mood of the US Congress and the political climate. Although the 1980 aid bill was not passed, aid has continued to flow at the 1979 levels, 30 percent below the budget requested. Congress, in general tends to be cautious of extending foreign aid where it believes the American Government has no direct control over the use of funds or recipients. Congress is also circumspect of aid requests from

19. "Hard Luck Story," The Economist, Vol. 276, No. 7150, American Survey: Aid, September 13, 1980, pp. 26-27.

governments it perceives are suspiciously left-wing. More often some crisis threatening US interests must develop before American aid is given. There is little likelihood of the advancement of science and technology in the Third World being perceived in itself as a crisis. It is, however, in the US interest in the long-term to provide direct assistance to the developing nations to aid these national programs.

The United Nations (UN) Conference on Science and Technology for Development, held in August 1979 in Vienna, proposed a UN-controlled fund of \$250 million to build up the science-base capacity of poor countries.²⁰ Total pledges by March 1980 came to a mere \$36 million. The US Congressional House Appropriations Committee cut the \$10 million for the fund from the 1981 budget. The United States has increased aid, in general, to Third World countries through the World Bank. In absence of the expected UN funds, direct funding and support of these programs are being derived elsewhere. The Organization of Petroleum Exporting Countries (OPEC), in lieu of supporting the UN-controlled fund, is pursuing the development of individual centers. A proposed Italian-Arab international institute in Rome for research on new sources of energy is being considered by the Arab Organization of Petroleum Exporting Countries. A more tangible situation has been an initial grant of \$50 million by Venezuela, a member of OPEC, for the creation of an International Institute for Advanced Studies at the University in Caracas for the development of science and technology. Additional funding for this project, up to \$200 million, may come from the petro dollars of OPEC. The development of Third World science by OPEC funding would mean that both the United Nations and the United States will have lost out.

20. William J. Broad, "Third World Science Vies for Petro Dollars," Science, Vol. 210, No. 4466, Briefing, October 10, 1980, p. 169.

Maintaining the good will and cooperation of Third World countries is as important to US foreign relations and economic interdependency as it is to the preservation of US-Third World mutual national security. The United States cannot wait for an international crisis to occur to request Third World basing rights for US forces. During the 1980 decade, long-range US planning ought to include creative and innovative means to assist the Third World countries to raise their status in the community of nations. Assisting them in their national development of science and technology is but one means to increase their national pride. Such foreign aid does not necessarily produce client states but it can do something for the donor's prestige and influence.

Search and Destroy. Between 1975 and 1980, revolutionary changes in the understanding of the process of defense against the invasion and infiltration of hostile attackers have been taking place. A new breed of defenders is being developed which can precisely search out, target with highly accurate guided missiles, and destroy or label for identification with uncanny specificity the hostile invaders.

The invaders might be the disease cells of cancer, multiple sclerosis, or leukemia; or the viral cells of influenza, rabies, or measles; or the parasitic cells of malaria. The defenders are antibodies, normally produced in the human body and active against a single type of disease cell. The new breed of defenders being developed are called monoclonal antibodies.²¹ They can be sensitized and cloned, and are extraordinarily pure, uniform, and reproducible. Experimentation has shown that they can seek out and attach themselves to important sites and tissues with sophisticated distinction, allowing scientists to

21. Harold M. Schmeck, Jr., "Cloned Antibodies Promise Medical Revolution," The New York Times, Science Times, August 5, 1980, p. C1-C2.

diagnose, identify disease location, and protect the patient from the disease. Whether they can also deliver a payload of destruction to specific disease cells or protect natural cells from the effects of excessive drugs or chemicals in patients is currently being investigated. Another use being explored is whether they might provide a possible means of desensitizing patients with allergies. Scientists and immunologists the world over are exploring cloned antibodies in search of new vaccines and treatments for disease and illness.

The continued success of this medical revolution suggests several important advantages for the Army in the future: military personnel are going to be healthier; medical care in peace time or during war can be directed toward the physically injured; and, well within the realm of possibility, the soldier in the field can have an immunity to chemical as well as biological agents.

FUTURE DIRECTIONS

In continuing to examine geographical areas as sources of conflict, arrangements have been made for papers to be written on South America, the Caribbean and Central America, and Indonesia.

The paper on terrorism reported in Periodic Report 3 is undergoing revision designed to indicate more clearly the implications for the Army and to include comments on legal restrictions.

One of the most puzzling political phenomenon to arise in recent years is the growth of the political force of the Moslem religion. The requirement for the United States to deal with significant Moslem theocracies may become a far more important international factor than it is today and, if so, there will be many more important implications for the Army. Initial steps have been taken to examine this question.

An author has been assigned to investigate the problem of support for a nonideological war.

APPENDIX A

SYNOPSIS OF PROBLEM RELATING TO NATO's LONG RANGE THEATER NUCLEAR FORCE DECISION

The Futures Group has begun to review NATO's December 1979 Long Range Theater Nuclear Force Decision and its possible long term implications. The December decision of the ministers was to modernize NATO's Long Range Theater Nuclear Forces (LRTNF) by the deployment in Europe of 108 Pershing II launchers and 464 Ground-Launched Cruise Missiles (GLCM). Initial deployment of these US produced and controlled weapons is expected in 1983.

NATO's Nuclear Planning Group (NPG) met in Florida in April 24-25, 1979, where their considerations included LRTNF modernization. Their considerations were echoed in the Defense Planning Committee meeting in Brussels in May 1979 where it was noted that,

For the first time a weapon on the continental scale can reach all the territories of Western Europe with multiple warheads from mobile launchers based in the Soviet Union.¹

This reference to the SS-20 was repeated in reports from the December meeting which confirmed, by now, the expected modernization decision.

The new NATO weapons are to be stationed in "selected countries," now apparently only Britain, the FRG, and Italy. The original intention to include the Netherlands and Belgium was resisted by those nations' parliaments. Indeed, the Netherlands especially has decided to delay its confirmation of the Alliance decision for perhaps two years.

The FRG apparently led the member states in adding to the LRTNF plan for the Alliance's parallel stipulation that arms control negotiations with the Soviet Union about theater nuclear forces should be undertaken [while] Alliance forces are being modernized.

1. Keesing's Contemporary Archives, November 2, 1979, p. 29912, quoting the DPC communique.

This brief and sketchy introduction to the results of the LRTNF decision is enough to hint at its complexity. The timing of talks and decisions strongly suggests that the European allies were apprised of the US intention to announce a change in its strategic deterrence policy. Although the US policy was announced with emphasis in June of 1980, its features were presumably evident in the US defense security's annual report issues very soon after the December decision. We must also assume, then, that the pending US change had some influence on the ministers' considerations.

Also in the context of the decisions of both the Alliance and of the United States was Britain's decision in July 1980, to modernize its strategic deterrent by acquisition of the Trident missile and submarine. As with Britain's current strategic force, the new one will be placed in the service of NATO.

Finally, the NPG is to examine the "nature, scope and basis of the adjustments resulting from" the LRTNF deployments and "their possible implications for the balance of roles and systems in NATO's nuclear armory as a whole."² The NPG report is due to the ministers in the autumn of 1980 (and may already be completed at this writing).

The purpose of the Futures Group analysis is to insure that the long range implications of this complex action are identified and clarified.

2. Keesings, March 28, 1980, p. 30159, Communique from ministers' special meeting in December 1979.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ACN 80067	2. GOVT ACCESSION NO. AD-A096337	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Futures Group Periodic Report--4		5. TYPE OF REPORT & PERIOD COVERED Futures Group Report
7. AUTHOR(s) COL Joseph L. Sites Mr. John F. Scott Mr. Charles W. Taylor		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE 1 December 1980
		13. NUMBER OF PAGES 25
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) "Global 2000", Nuclear Proliferation; Detente; Women in Combat; Third World Science and Technology; Medical Technology.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This is the fourth periodic report of the Futures Group and covers these following subjects: "Global 2000," nuclear proliferation, detente, women in combat, Third World science and technology, and medical technology.		

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